

outwards. Vents numerous, irregularly scattered over the surface. Texture soft, reticular, without fibre, more or less cellular, traversed by the branches of the excretory canal-system, which terminate in the vents mentioned. Spicules of two kinds, viz.:—1, skeletal, pinlike, with terminal or ant-terminal more or less capitate inflation, curved, slightly fusiform, gradually sharp-pointed, 265 by 5-6000ths inch in its greatest dimensions (fig. 2, *a*); 2, flesh-spicule, stelliform,

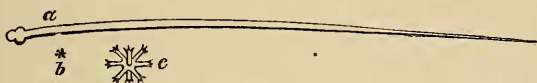


Fig. 2.—Spiculation of *Suberites stelligerus*. *a*, skeletal spicule; *b*, flesh-spicules: scale 1-96th to 1-6000th inch. *c*, flesh-spicule, much more magnified, to show general form and spinous ends of rays.

more or less nucleated, in which originate 8-10 straight rays, each of which terminates abruptly in four or more short everted spines about 4-6000ths inch in diameter (fig. 2, *b*, *c*). Pinlike spicules and stellates equally plentiful. Size of specimen 6 inches high, 4½ inches broad, and 2 inches thick.

*Hab.* Marine.

*Loc.* Honduras.

*Obs.* This sponge, from its loose, apparently compressed, fibreless structure, pinlike form of the skeletal spicule, and presence of shell detritus imbedded in its surface, has all the characters of a Suberite belonging to my group *Laxa*; but the presence of the *stellate* flesh-spicule is new to me, although not in allied forms, ex. gr. *Axos Cliftoni*, *A. flabelliformis* ('Annals,' 1879, vol. iii. pl. xxvi. figs. 3 and 6), and the small stellate in *Donatia lyncurium*. From the old appearance and mutilated condition of the specimen, which belongs to the Bowerbank general collection, it appears to have been picked out of a sandy beach, where it might have been for years, and now bears a label on which is written "Honduras, Dyson;" hence the locality is known.

### XIII.—Contributions to the Knowledge of the Alcyonaria.

Part II., including Descriptions of new Species from Mauritius. By STUART O. RIDLEY, M.A., F.L.S., &c.

[Plate V.]

LIKE the first paper of this series (this Journal, ser. 5, vol. ix. p. 184), the present communication will be found to owe its

chief importance to specimens collected by Mr. V. de Robillard at Mauritius, all those given below as from this locality having been obtained from that collector. But while the former were chiefly remarkable for size and beauty, and only secondarily for their novelty in some cases, those now to be described include some of the greatest interest from the rarity and high systematic importance of the types to which they belong, and will be seen to throw important light on the distribution of the genera of Alcyonaria in our present seas. I have added notes on two species not from Mauritius, the reasons for which will be seen by reference to the remarks on *Echinomuricea coccinea* and *Eunicella pergamentacea*.

### Fam. Primnoidæ.

#### ACIS.

*Acis*, Duchassaing de Fonbressin & Michelotti, Mém. Cor. Ant. p. 19.

This genus has hitherto been known only from the West Indies, whence the above-named authors described the only known species, *A. guadalupensis* (*l. c.* p. 20, Guadelupe) and *nutans* (Suppl. Mém. Cor. Ant. p. 109, Santa Cruz): the one has a prominent verruca, covered with numerous squamous spicules, while that of the latter is barely raised above the general surface; the one appears to connect the genus with *Primnoa*, the other with *Muricea*. The occurrence, as will now be shown, of this otherwise West-Indian genus in the Indian Ocean, and in its western portion in particular, has a peculiar significance for the student of geology, as showing that a communication probably existed between these two areas at a period later than that at which the genus was differentiated from the main stem of the family; the distribution of *Villogorgia* (see Ann. & Mag. Nat. Hist. ser. 5, vol. ix. p. 187) and *Melitodes* (*Melithæa*, Lamarck &c.), in both which cases a single species of an exclusively or almost exclusively Indo-Pacific genus represents it in the West-Indian area, appears to show the same fact. This group, from the wide range of its species, is especially fitted to illustrate a truth of this kind.

#### *Acis orientalis*, sp. n.

Corallum branching approximately in one plane; branching dichotomous, with the addition of alternating pinnæ at different points; branches given off at short intervals. Common stem very short. Stem and branches cylindrical, hardly diminishing appreciably in thickness from the base upwards; ends of

branches slightly clavate; diameter at base 2 millim., just before apex of branches 1·5 millim., at apex 2 millim. Verrucæ low, broad at summit, about ·5 millim. high and ·9 millim. across, alternate, 1 to 3 millim. apart, almost entirely confined to the anterior and lateral aspects of the branches. Colour of general cortex dirty white (the spicules white, outlined with an umber pigment), of verrucæ umber-brown, their centres white when closed. Axis flexible, thin; pale brown at ends of branches. Spicules of general cortex:—(i.) Large, modified fusiform, consisting of a body tapering more or less towards the ends and of several (about ten) large monticular prominences arranged on the outer side of the spicule; the whole spicule and the prominences densely covered with low broad tubercles, themselves very elaborately tuberculate; size of spicule very various—average maximum about 1·8 millim., shortest diameter about ·28 millim., largest diameter (that which includes the monticular processes) about ·45 millim.; height of these prominences ·07 to ·14 millim. These large forms pass by gradation into smaller ones of about ·62 by ·14 millim., with the monticular processes often very small. (ii.) Squamous, with monticular process in the centre of the outer side; the margin cut into lobes of different forms and sizes, sometimes divided into secondary lobules; average maximum size about ·7 by ·52 millim. (iii.) Spicules of verrucæ, horizontal series surrounding the base of the verrucæ, and forming a ring by the apposition of their ends, fusiform, bent at the middle, tapering gradually to slender pointed ends, covered closely with small simple tubercles, largest at the middle; size about ·45 by ·07 millim. (iv.) A modified form of (ii.), consisting of flattened tuberculate basal portion fixed at the outer margin of the verruca, and an elongate projecting part, which rises up from and (with its companions) forms a crown upon the margin of the verruca; it is much roughened by tubercles, chiefly ridge-like, serrate, and directed forwards; the apex of the spicule is irregular; size about ·47 by ·14 millim. (v.) Fusiform, radiating from the interior of the wall of the verruca (meeting in its middle in the contracted state of the polype); they taper to sharp points, and are covered with thin, ridge-like, mostly forwardly-projecting tubercles; size about ·28 to ·42 millim. by ·053 to ·07 millim.

*Hab.* Mauritius, 80 fathoms.

*Obs.* The species is represented by three specimens growing on a mass of sponges and other forms, including *Cirripathes* and another Primnoid Alcyonarian.

The larger specimen is 90 millim. ( $3\frac{3}{5}$  inches) high and 70 millim. ( $2\frac{4}{5}$  inches) broad.

The species differs from both the West-Indian forms in the possession of flat squamiform in addition to the fusiform cortical spicules, and in the guarding of the mouth by the projecting points of the modified squamiform spicules. I find no trace of the "very fugitive" surface-layer of "squamules" stated by Duchassaing de Fonbressin and Michelotti (Suppl. Mém. Cor. Ant. p. 108) to overlie the larger fusiforms, although the specimens are as fresh and perfect as dried specimens can be.

*Muricella perramosa*, sp. n.

Corallum branching abundantly, commencing at or near the common spreading base; branches decreasing gradually in diameter towards apex. Branching primarily dichotomous; but most of the branches are pinnate alternately with terminal or branched twigs set about 4 millim. apart; the larger branches given off at angles of about  $45^{\circ}$ , the smaller ones and the terminal twigs at about  $80^{\circ}$ . Most branches subcylindrical, the lateral diameter being slightly the largest (some terminal twigs appear decidedly flattened out laterally, owing to the lateral position of their verrucæ). All the branches are more or less curved; owing to this and to the profuseness of the branching, the frond has a broad fan-like outline. Branching takes place, as a rule, in one plane; but the frond is curved in and out of this plane, and secondary fronds more or less parallel to the axis of the main frond are not uncommon.

Greatest diameter of main branches about .18 millim., of terminal twigs (excluding verrucæ) .018 millim., length of latter about 7 millim.

Cortex compact, thin, rendered slightly uneven by the thickness of the largest spicules below described. Verrucæ hemispherical (sometimes extended in the direction of the long axis of the branches), rising sharply from the cortex; height and basal diameter both about .5 millim.; frequent on all parts of the corallum, and only 1 millim. apart on the terminal twigs (occasionally absent on one side of the branches for considerable distances, and almost confined to the lateral margins of many of the terminal twigs). Colour of entire corallum dull crimson-red, inclining to brick-red. Spicules of general cortex:—(i.) fusiform elongated, lying parallel to the axis of the corallum, tapering to moderately sharp points from the middle, straight or slightly flexuous, densely covered with prominent tubercles, which are simple and more or less pointed towards the ends of the spicule, but towards the middle become terminally swollen and roughened (these median tubercles measure .2 to .3 millim. in height by .017 to .025 in maxi-

mum diameter at apex). Two sizes are distinguishable, though approximately connected by intermediate sizes; they are (1) about 1 by  $\cdot 18$  millim., and (2) about  $\cdot 42$  by  $\cdot 053$  millim., and  $\cdot 017$  to  $\cdot 025$  in apical diameter. No. 1 occurs scattered singly among the far more numerous no. 2, and may be seen on the surface of the cœenchyma with a lens. (ii.) Smaller irregular linear spicules, with approximately pointed ends and two more or less distinct whorls of coarse, rough, and often divided tubercles, about  $\cdot 035$  millim. high; length of spicule  $\cdot 12$  to  $\cdot 14$  by  $\cdot 07$  millim. Proper spicules of verrucæ subfusiform, with rounded ends, and covered with low tubercles; length  $\cdot 28$ , breadth  $\cdot 038$  millim.

*Hab.* Mauritius, 90 fathoms.

*Obs.* Very fine specimens of this graceful species have been obtained from Mr. de Robillard; the largest measures 20 inches (500 millim.) in height by 19 inches (475 millim.) in extreme breadth. It seems to be the abundance and slender proportions of the branches and the number of curved lines which they present that give this form so light and elegant an appearance.

It differs in slenderness of habit from *M. humosa* and *M. tuberculata*, Esper, and in its uniform red colour from all the other known species.

#### *Echinomuricea coccinea.*

In my former paper (ser. 5, vol. ix. p. 184) I included *Nephthya coccinea*, Stimpson, among the species to be distinguished in the genus *Nephthya*, overlooking the fact that Verrill had re-examined Stimpson's specimens, and found it necessary to place the species in the genus *Acanthogorgia*, and subsequently (Amer. Journ. Sci. xlvii. p. 285) formed the genus *Echinomuricea* (Proc. Ess. Inst. iv. pp. 152, 188) to contain it. As an examination of specimens in the British Museum shows the propriety of Verrill's proceeding, I shall in future allude to the species as *Echinomuricea coccinea*.

#### Fam. Gorgoniidæ.

##### *Eunicella pergamentacea*, sp. n.

*Gorgonia viminalis*, var., Esper, Pflanzenth. ii. p. 51, pl. xi. A.

This species appears to be distinct from *G. viminalis* of Esper; the few and long terminal branches, the distance which separates the verrucæ, and the loose character and whitish colour of the cortex (causing it to wrinkle when dried) appear points of sufficient importance to separate it from that species.



At the same time the spiculation is essentially that of *Eunicella*, the genus to which Verrill refers *Gorgonia verrucosa* and numerous other Atlantic species.

*Hab.* Mediterranean (*Esper*).

It is from the leathery or parchment-like appearance of the cortex when dried that the specific name *pergamentacea* has been taken. It seems to me important to distinguish a species which, though not uncommon, has hitherto been confounded with another form.

### Fam. Gorgonellidæ.

#### *Nicella dichotoma*.

*Scirpearia dichotoma*, Gray, P. Z. S. 1859, p. 481.

*Nicella mauritiana*, id. Cat. Lithophytes Brit. Mus. p. 40, fig. 12.

Some good-sized specimens have been received from Mr. de Robillard; the largest measures 340 millim. ( $13\frac{1}{2}$  inches) in height from the (dead) base, and 240 millim. ( $9\frac{1}{2}$  inches) in maximum diameter. Studer (M.B. Ak. Berlin, 1878, p. 660, pl. v. fig. 31) seems by his figure to have wrongly identified the species. The original specimens have for their spiculation a dense cortical layer of small double heads, and a subjacent layer of longer densely tuberculate cylindricals or fusiforms, having a median bare space more or less strongly indicated. The colour is variable; that of one specimen varies from ochreous yellow to dull flesh-colour; that of another is dirty white. The shape of the verrucæ varies considerably, according as they are open or closed: in the former condition they are rectangular at the apex, as seen from the anterior or posterior sides of the frond, while in the latter they usually appear conical, with rounded apices, when viewed in the same way. Their basal diameter may vary from 1.25 to 2.25 millim. in the closed condition. The axis is strongly penetrated with carbonate of lime.

It appears to me that the earlier specific name should be maintained.

*Hab.* Mauritius, 80 fathoms.

### Fam. Trinellidæ, Gray.

#### PARISIS.

This genus is allied to *Trinella*, Gray; but the latter has no true spicular verrucæ; while in *Parisis* the spicules, the subjacent ones of which have the same general character as in *Trinella*, ascend into and support the verruca.

The genus has not been hitherto recorded as occurring out

of the Chinese seas, the type species, *P. fruticosa*, having been taken in the Sooloo Sea, and the only other species, *P. laxa*, at Hong Kong and in Formosa Channel.

*Parisis mauritiensis*, sp. n.

Corallum flabellate, branching in one or more parallel planes. Branching frequent, approximately dichotomous for the first three or four divisions, the smaller branches alternately pinnate; branches given off at an angle of  $45^{\circ}$  (occasionally about  $60^{\circ}$  in small branches). Stem and main branches cylindrical, the subterminal branches with their terminal pinnæ flattened out laterally. The larger branches marked in some places by longitudinal striæ (the reflex of the longitudinal canals) in the dry state. Hard and soft joints of same length, viz. about 3 millim. In the main branches the soft joints are somewhat narrower than the hard ones in the dry state (possibly owing to shrinkage), producing a somewhat annulated appearance in the branch. Cortex compact, smooth, about

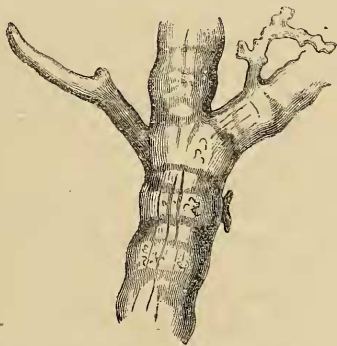


Fig. 1.—*Parisis mauritiensis*: the second bifurcation from base, nat. size.

·25 millim. in thickness, pure white in dry state. Diameter of largest main branch 10 to 11 millim., greatest diameter of terminal (flattened) twigs ·7 millim. Verrucæ confined (with rare exceptions) to lateral aspects of terminal and subterminal branches (occasionally a few on branches of the third degree), uniserial, alternate, 1 to 2 millim. apart; truncato-conical in shape, projecting somewhat upwards as well as outwards; height about ·8 millim., apical diameter ·5 millim.; of same colour as cortex. Superficial spicules of cortex and verrucæ very various in shape, viz. subglobular, limaciform, or elongated, with median constriction (Germ. "bisquitförmig"); beset with small pointed low tubercles; maximum diameter varying from ·038 to ·0633, smallest diameter ·022 to ·032

millim. Subjacent spicules of cortex subcylindrical, with irregular ends, and more or less constricted at one or two points; beset with few scattered rough boss-like tubercles; size about  $\cdot 1$  by  $\cdot 053$  millim.

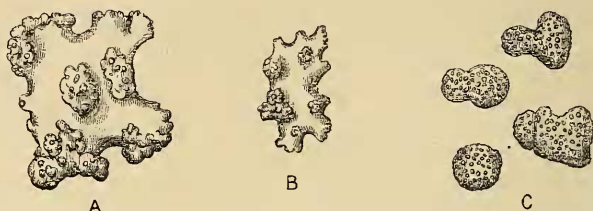


Fig. 2.—*Parisis mauritiensis*. A, superficial spicule,  $\times 190$  diam.; B and C, subjacent spicule of cortex,  $\times 190$  diam.

*Hab.* Mauritius, 80 fathoms.

*Obs.* The specimen upon which this species is based is in the dry state, and measures 19 inches (480 millim.) by  $12\frac{1}{2}$  inches (315 millim.) in maximum height and diameter respectively. It very closely resembles in character *Parisis fruticosa* (judging chiefly from a specimen in the Museum from Formosa, which appears to belong to that species); but in it the verrucæ appear to be somewhat more distinct from the branches, and not directed forwards, and are not confined to the lateral aspects of the branches. In *Parisis laxa* the verrucæ are said to be crowded, the coenenchyma rough, and the branches occasionally coalescent, characters which do not apply to *P. mauritiensis*. The extension so far to the west of the Indian Ocean of a genus hitherto known only from Chinese seas is a fact of considerable interest.

#### Subfam. *SCLEROGORGIACEÆ*.

##### *Suberogorgia suberosa*.

An immense dry specimen 3 feet 5 inches high and 18 inches in maximum lateral diameter. The colour is pale wainscoat to pale rufous brown; the branches are given off mostly at angles of  $30^\circ$ . The colour, very different from the deep brick-red usual in this species, may perhaps be due to the manner of drying. The spiculation presents no points by which to distinguish this form from typical specimens of the species, although the very stout main stem and larger branches, and the relatively small lateral expansion of the branches, give it a somewhat unusual appearance.

*Hab.* Mauritius, 90 fathoms.



## EXPLANATION OF PLATE V.

- Fig. 1. *Acis orientalis*: part of largest specimen, from front, natural size.  
 Fig. 2. The same: apex of branch, from front,  $\times 8$  diam.  
 Fig. 3. The same: apex of branch, from behind,  $\times 8$  diam.  
 Figs. 4 & 5. The same: cortical fusiform spicules No. 1,  $\times 43$  diam.  
 Fig. 6. The same: cortical squamous spicule No. 2,  $\times 43$  diam.  
 Fig. 7. *Parisis mauritiensis*: lateral branch, nat. size.  
 Fig. 8. *Muricella perramosa*: terminal branch, nat. size.  
 Fig. 9. The same: cortical spicule No. 1,  $\times 43$  diam.  
 Fig. 10. The same: cortical spicule No. 2,  $\times 43$  diam.
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XIV.—*Carcinological Investigation on the Genera Pemphix, Glyphea, and Aræosternus.* By T. C. WINKLER\*.

I. *Introduction* †.

A few months ago Dr. J. G. De Man, Curator at the Museum of Natural History at Leyden, informed me that he

\* Translated by W. S. Dallas, F.L.S., from the 'Archives du Musée Teyler,' ser. ii. deuxième partie (1881), pp. 73–124.

†

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